

Medication Administration Errors Evaluation in Pediatric Ward by Pharmacist

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Abstract— Study was designed to value the medication administrating mistakes frequency and prevention strategy in a pediatric ward. The study was prospective observational based. Assessment of all the treatment chart of admitted patients by Pharmacist throughout the study duration and analyzed the administration mistakes in medicine as per WHO guidelines. Data was collected from pediatric ward of (BMCH) Bolan Medical Complex Hospital, Quetta from the period of October - November 2015 in a data collection form. Descriptive statistical data was analyzed, interpreted and the related samples Cochran's-Q test was applied and analyzed by SPSS 22. The 287 patient's treatment chart were assessed and the total drug administration were 8179, out of which drug administration to male patients were 5156 (63%) and female patients 3023 (37%). The total administration errors in medication were recorded 6718 (82.13%), which include 6607 (98.34% of total errors) were omission errors, followed by 43 (0.64%) wrong time error, 41 (0.61%) un-authorized drug error wrong frequency error 13 (0.19%), wrong dose error 11 (0.16%), incorrect dosage form error 02 (0.02%) and wrong error route 01 (0.01%). There was a high percentage of administration mistakes in pediatric ward in which omission error was most frequent administration error made by nurses throughout the practice of medicines administration. Nurses mentioned a multiplicity of issues as causative to errors but the utmost common issues associated to the fact that medications were administered in a busy, noisy surroundings to problematic, troubled patients, workload, occasionally by fewer than best staffing levels, individual issues; such as feeling exhausted, unsupported, distressed and deficiency of awareness in nurses about medication administration process. These features have been acknowledged as relevant to error relationship in practice of nursing.

Keywords— Pharmacist, administration, medication errors, nursing, pediatric, WHO Guidelines.

I. INTRODUCTION

Administration errors is connected with mistakes in the pediatric populace [1, 2]. In the hospital setting most usually administer medicines to patients without nurses not possible and it have an affinity to be the nurses are supposed answerable for any mistakes and their significances [3]. The medicine administration has existed individual of the maximum risk areas in nursing practice [4]. Administration mistakes in medicine are the most corporate [5]. Medicine mistake strength happen at any phase of healing managing [6]. This comprises the medicines prescribing medicine transcribing, medicine dispensing, preparing of medicines and medication administration, monitoring and documentation of medicines to the patients [6, 7]. It is important to catch resolutions to reduction damaging and possibly harm mistakes [8]. Medicine errors in common are a significant matter to speak mostly with respect to the patient of pediatric

ward [9]. Statistics concerning defensive approaches and recognition tackles are more usually accessible for mature patients than pediatric patients [10]. Medication mistakes are worldwide familiar and the encounter is more corporate in children's because they are at more risk of harm from medication faults than mature patients [11].

Aimed to decrease prescription and administration errors the importance of preventive initiations in increasing patient safety was emphasized [12]. Patient safety has drawn attention in recent years, there is very limited information about the incidence of pediatric medication errors [2, 13]. It is perfect that frequency definition and reasons of pediatric administration errors and evaluation of the efficiency of preventive interventions will be directive in methods directed to patient safety [14]. In this study, pediatric medicine administration errors indicating that administrating mistakes are a global problem which is expected to be solved.

II. RELATED WORK

Administration of medicines is a significant part of nursing practice and a significant duty for nurses [15-18]. Medicine error has been well-defined by the (NCCMERP) "National Coordination Council for Medical Error Reporting and Prevention" as: 'An avoidable event causing medication to harm a patient or a patient to take an inappropriate medication, despite its being under the control of health workers, the patient or the manufacturer [18,19].

Earlier studies have established high mistake rates for medicine errors in children wards. Observational researches, which deliver objective, effective, and usable results around extant mistake rates, have resolute mistake rates to be among 5.1% and 40.4% [20-24]. The utmost recurrent mistakes were determined as time mistake and dose mistake [2, 21]. Incorrect time mistake rates were found to range among 24% and 36% and incorrect dose mistakes among 1.5% and 26.7% [2, 22]. The present study is the first study which was conducted on pediatric inpatients in Pakistan.

III. METHODOLOGY

Study Design:

This was prospective observational based study used in describing the incidence of administration errors.

Study Setting and Sampling:

The study was conducted in pediatric ward Unit-B of Bolan Medical Complex Hospital Quetta, a teaching hospital, 800 bedded, working under the Baluchistan government, Pakistan. Pediatric ward of BMCHQ, Pakistan has 50 bedded, 4 nurses in the morning shift, 2 nursing students in evening shift and 2 nursing students in night shift working in this unit. Morning Shift starts from 8:30 AM to 2:30 PM, evening shift starts; 2:30 PM - 8:30 PM and night shift; 8:30 PM to 8:30 AM respectively. The nurse patient ratio was in the morning shift 1:12 approx., evening and night shift 1:25. The medicine administration mistakes of all registered cases were assessed, the 8179 drug administration were detected throughout the study dated. The study was conducted from October- November 2015. Medicine administration mistakes were conceded out in a data collection form by Pharmacist.

Data Collection:

The data of the study was collected from the treatment chart of admitted cases in pediatric ward of BMCHQ, Pakistan. Data Collection Form was used to measure medicine administration mistakes, which includes areas of date, time, patient name, age, gender, shift, Nurse, drug title, path of administration and medicine frequency. The medication administration errors include; wrong dose frequency, wrong administering technique, wrong dosage form, wrong time, wrong route, omission error and unauthorized drug error. The medication error classification made by ASHP (American Society of Health-System Pharmacists) [25]. The schedule of

I/V doses were 6, 10, 12, 14, 18, 22 and 24 assessed by the treatment chart and administration drugs was confirmed from the attendants of admitted patients randomly by the Pharmacist. Pharmacist identify that what types of medicine administration errors did the nurses make.

Data Analysis:

Descriptive statistical data was analyzed and interpreted and the related samples Cochran's-Q test was applied to observed the null hypothesis significance level ($p < 0.05$) by SPSS 22.

Ethical Consideration:

The Research was sanctioned by the Ethics and Research Committee, faculty of pharmacy, university of Baluchistan, Pakistan. Prior permission was taken from the Medical Superintendent and head of pediatric department Unit-B of BMCHQ, Pakistan.

IV. RESULTS AND DISCUSSION

A. The total number of 287 patients were admitted out of which 180 (62.71%) were males and 107 (37.2%) were females, treatment chart was assessed. The total drug administration was 8179, out of which drug administration to male patients were 5156 (63%) and drug administration to female patients were 3023 (37%). The total drug administration to the different age groups of children were as follows; < 1 years 1692 (20.7%), 1 year-3 years 3043 (37.2%), 3 years-5 years 992 (12.1%), 5 years-7 years 486 (5.9%), 7 years-9 years 556 (6.9%), 9 years-11 years 738 (9.0%), 11 years - 13 years 481 (5.9%) and 13 years & above 181 (2.2%). The drug administration in morning shift were 3933 (48.1%), evening shift 1181 (14.4%) and in night shift 3065 (37.5%) as shown in table no.1.

B. Patient Admission Analysis; the total number of 287 patients were admitted throughout the study duration out of which discharged (improved) patients were 205 (71.42%), LAMA (Left Against Medical Advice) were 32 (11.14%), total expired patients were 23(8.01%), I/V stopped (shifted to the oral medicines) was 01(0.34%), D.O.R (discharged on request) patients were 07 (2.43%), referred to other hospital 01 (0.34%) and Patient Still in Unit were 19 (0.06%) as shown in table no.01.

C. The total drug administration were 8179 out of which the total medicine administering faults were 6718 (82.13%), which include 6607 (80.78%) were omission errors, followed by 43 (0.64%) wrong time error, and 41 (0.61%) unauthorized drug error, wrong frequency error 13 (0.19%), wrong dose error 11 (0.16%), incorrect dosage form error 02 (0.02%) and wrong error route 01 (0.01%), applied related samples Cochran's-Q test significance level ($p < 0.05$) as shown in table no.02 and fig no.1.

D. Comparison of omit mistakes distribution with age groups; in < 1 year omission errors were 1404 (21.25%), 1 years-3 year 2397 (36.27%), 3 years -5 years 802 (12.13%), 5 years-7 years 389 (5.88%), 7 years -9 years 494(7.47%), 9 years-11 years 617 (9.33%), 11 years – 13 years 350 (5.29%) and 13 years & above 154 (2.33%) as shown in table no.3.

E. The most frequent omission errors distribution in antibiotics and lifesavings drugs were as follows, the omission errors in Ceftriaxone Sodium were 2207 (79.84%), Vancomycin 764 (80.59%), Ampicillin + Cloxacillin 1630 (81.05%), Tobramycin 334 (81.86%), Cefepime 171 (83.82%), Ciprofloxacin 62 (84.93%), Amikacin 29 (80.55%), Hydrocortisone Succinate Sodium 53 (84.12%), Dexamethasone 200 (83.68%), Phenobarbitone 53 (91.37%) and Calcium Gluconate were 27 (93.10%) as shown in table no 4.

Discussion.

The data of study were together by observation technique in a long time period at the hours at which most drugs were administered in the daytime and night time increased the objectivity of the results.

Ozkan et al. 2013 performed a study in which, the rate of time errors was 10.6% and dose errors was 10.3% [14]. But at present study wrong frequency error was 0.5% and wrong dose error was 0.10%, which was contradictory. The entire mistake frequency was observed it was found to be 28.2% [14]. The rate of error was 31.3% in the study executed by Prot et al. [26] and 27.6% in the study performed by Ghaleb et al. [27]. But if comparison made with recent studies the result of existing study was contradictory to the studies performed by (Prot et al., Ghaleb et al., and Ozkan et al), the total errors rate was very high (82.13%).

The dose mistakes (errors of omission, un-authorized medicine mistakes and incorrect dose mistakes) were the most frequent (41%) of total errors followed by incorrect time error was (26%) and incorrect rate errors was (19%) (28). But in the existing study administration errors rate was recorded 6718 (82.13%) which include 6607 (98.34% of total errors) were omission errors. The overall errors rate and omission errors were in high percentage but wrong time error 43 (0.64%) and un-authorized drug error 41(0.61%) which was in low percentage. The study conducted by M-P. Schneider, total errors was 26.9% [22]. The most common mistakes stayed wrong time (32.4%) and incorrect administrating technique mistakes were (32.4%) [22]. But in present study the total frequency of errors was (82.13%), which was very high percentage but wrong time errors were (0.5%) and wrong administration technique errors were 0 (0.00%), which displays the results of existent study was contradictory.

The most corporate categories of mistakes resulting in patient motility complicated administering an improper dosage (40.9%), administering the wrong drug (16%), and using the wrong route of administration (9.5%) [29]. But in existing study wrong dose errors were (0.10%), un-authorized drug errors were (0.61%) and wrong route errors were (0.01%), which shows the result of present study was better than the study performed by (Jerry et al 2001) [29].

This study was the first study in which pediatric medication errors were determined by way of observation method in Pakistan. Our results carry the finding that medicine administrating inaccuracies were made with a high rate in pediatrics. Pediatric medicine administration inaccuracies are global problem which is expected to be solved effective manner.

Recommendations:

Educational programs and training of nurses about medicine administration inaccuracies should be conduct. Future Pharmacist intervention studies recommended for the patient safety and prevention of medication administration errors.

Limitations:

The result of this study was not representing any other ward or hospital in Pakistan. Medication administration errors assessed only in pediatric ward Unit-B of BMCHQ, Pakistan.

V. CONCLUSION AND FUTURE SCOPE

There was a high percentage of administration mistakes in inpatient surroundings in which omission error was most frequent administration error made by nurses throughout the medicines administration process. Nurses mentioned a multiplicity of issues as causative to errors but the utmost common issues associated to the fact that medications were administered in busy, noisy surroundings to problematic, troubled patients, workload, occasionally by fewer than best staffing levels, individual issues; such as feeling exhausted, unsupported, distressed and deficiency of awareness in nurses about medication administration process. These factors have remained recognized as relevant to errors causation in practice of nursing.

Summary Box:

What does this paper contribute to the wider global community?

Certain clinically essential matters were talked in this study were as follows.

1. The lack of drug knowledge of nurses is main factor contributing to medication errors.
2. Every nurse must take suitable steps to grow and keep capability in relative to all phases of medicine management and to confirm that his or her information, expertise and clinical practices are up to date.

3. Medicine management would also be spoken inside nursing learning, together in the nursing student's preparation for practice and in the permanent nurse's education.

Conflict of Interest:

The author(s) affirmed that they have no clash of interests.

Figures and Tables

Table no. 1: Drug Administration Comparison with Gender, Age Groups, Shifts / Patient Admission Analysis.

Drug Administration Comparison (N=8179)		
Description	Frequency	Percent
Drug Administration by Gender		
Male	5156	63.0
Female	3023	37.0
Drug Administration in Different Age Groups		
< 1 year	1692	20.7
1 year-3 years	3043	37.2
3 years -5 years	992	12.1
5 years-7 years	486	5.9
7 years -9 years	566	6.9
9 years-11 years	738	9.0
11 years – 13 years	481	5.9
13 years & above	181	2.2
Drug Administration in Different Shifts		
Morning	3933	48.1
Evening	1181	14.4
Night	3065	37.5
Patient Admission Analysis (N= 287)		
Admission	287	100.00
Discharged (Improved)	205	71.42
LAMA	32	11.14
Expired	23	8.01
I/V Stopped	1	0.34
D.O.R	7	2.43
Referred to Other Hospital	1	0.34
Patient Still in Pediatric Unit	19	0.06
LAMA= Left Against Medical Advice, D.O.R= Discharge on Request		

Table No. 2: Distribution of Administration Errors

Distribution of Medication Administration Errors (N= 8179) Related Samples Cochran's-Q Test					
Administ-ration Errors	Frequency	Percent	Mean	Std. dev.	Sig (p<0.05)
Wrong Dose Error	11	0.10	2.00	0.037	0.001
Wrong Dosage Form Error	02	0.02	2.00	0.016	0.001
Wrong Time Error	43	0.50	1.99	0.072	0.001
Un-Authorized Drug Error	41	0.50	1.995	0.0706	0.001
Wrong Frequency Error	13	0.20	2.00	0.040	0.001
Omission Error	6607	80.78	1.19	0.394	0.001
Wrong Route Error	01	0.01	2.00	0.011	0.001

Wrong Administration Technique Error	0	0.00	2.00	0.000	0.001
Total Errors:	6718	82.13%			

Table 3: Comparison of Omission Errors Distribution with Age Groups.

Comparison of Omission Errors Distribution with Age Groups (N= 6607)		
Age Groups	Omission Errors	Percent
< 01 year	1404	21.25
01 year - 03 years	2397	36.27
03 years - 05 years	802	12.13
05 years - 07 years	389	5.88
07 years - 09 years	494	7.47
9 years - 11 years	617	9.33
11 years - 13 years	350	5.29
13 years & above	154	2.33

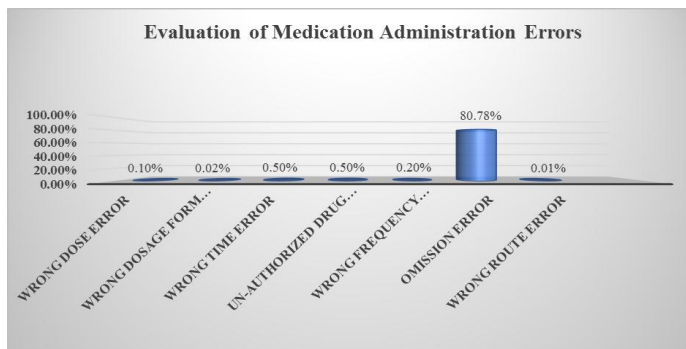


Fig. 1: Evaluation of Medication Administration Errors

Table no.04: Omission Errors in Intravenous Antibiotics and Life Saving Drugs

Omission Errors in Intravenous Antibiotics and Life Saving Drugs (N=6607)		
Drug Name	Omission Errors	Percent
Ceftriaxone Sodium	2207	79.84
Vancomycin	764	80.59
Ampicillin + Cloxacillin	1630	81.05
Tobramycin	334	81.86
Cefepime	171	83.82
Hydrocortisone Succinate Sodium	53	84.12
Dexamethasone	200	83.68
Flagyl Infusion	46	44.66

Ringer Lactate	26	96.29
5% Dextrose Water	03	96.29
MgSO ₄	181	78.35
Phenobarbitone	53	91.37
Ciprofloxacin	62	84.93
Furosemide	129	86.57
Calcium Gluconate	27	93.10
10% Dextrose Water	21	91.30
Amikacin	29	80.55
1/2 Saline + 5% Dextrose Water	50	87.71
Ranitidine	54	75.00
Fluarix (Influenza Vaccine)	2	100.00

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